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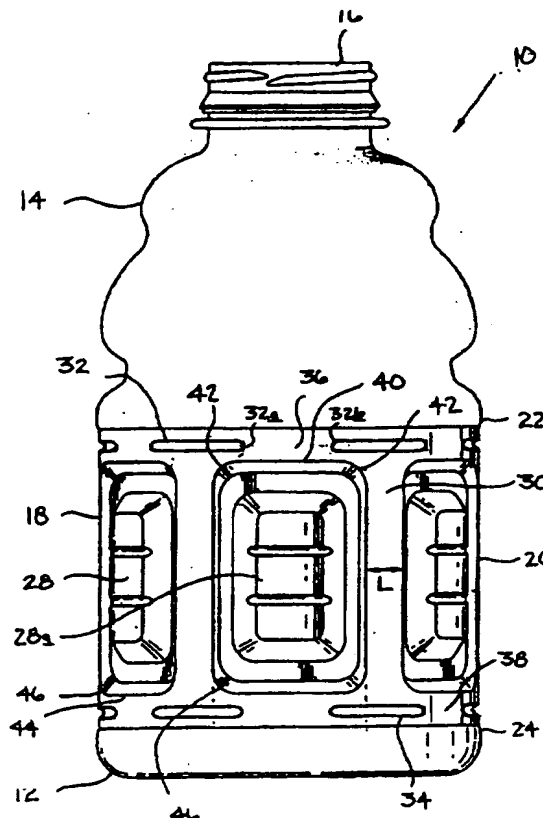
With international search report.

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(54) Title: BLOW-MOLDED CONTAINER HAVING LABEL MOUNT REGIONS SEPARATED BY PERIPHERALLY SPACED RIBS

(57) Abstract

A blow-molded plastic container (10) intended for use in hot-fill processing. The container (10) has a series of short, upper and lower ribs (32, 34) which are spaced apart endwise and which extend peripherally about the container sidewall above and below lands (30) between vertically elongate collapse panels (28) and adjacent corners (42, 46) of collapse panels (28) to reinforce the container (10) at selected locations while providing additional areas for receiving label attachment adhesive.



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BLOW-MOLDED CONTAINER HAVING LABEL MOUNT REGIONS  
SEPARATED BY PERIPHERALLY SPACED RIBS

Field of the Invention

5       The present invention relates to blow-molded plastic hot-fill beverage containers, and more particularly to a container having a series of short, peripherally spaced ribs in the sidewall of the container to stiffen the sidewall adjacent collapse panel corners while enhancing label attachment.

10      Background of the Invention

      Blow-molded hot-fill containers having vacuum-collapse panels and reinforcing ribs are known. For instance, U.S. Patent 4,863,046 to Collette et al. discloses vertically-disposed ribs in the land area  
15      between adjacent panels. U.S. Patent 5,054,632 to Alberghini et al. discloses a continuous peripheral rib medially of the label panel area between upper and lower arrays of collapse panels. U.S. Patent 5,064,081 to Hayashi et al. discloses, in FIGs. 8 and 9, a container  
20      of square cross-section having reinforcing ribs located directly above and below vertically-elongate collapse panels. U.S. Patent 5,178,289 to Krishnakumar et al. discloses interrupted ribs in a container structure similar to that disclosed in the aforementioned '046  
25      patent to Collette et al. U.S. Patent 5,337,909 to Vaillencourt discloses a hot-fill container having continuous peripheral ribs in a label mounting region above and below vacuum panels.

      In the '909 Vaillencourt patent, the continuous  
30      reinforcing rings, being located in the label mounting area of the container, limit the area available for the application of label adhesives. Although the Hayashi et al. patent incorporates discontinuous reinforcing ribs, they are located directly above and below the vacuum  
35      panels at locations that do not provide significant

reinforcement. A commercially desirably hot-fill blow-molded vacuum-panel container is one which provides desirable reinforcement in conjunction with a maximum area for application of label adhesive.

5 Objects of the Invention

With the foregoing in mind, a primary object of the present invention is to provide a hot-fill blow-molded container having collapse panels that are reinforced in a manner that also maximizes areas available for the application of label adhesive.

Summary of the Invention

More specifically, the present invention provides an improved hot-fillable, blow-molded plastic container for containing a liquid filled initially in a hot state and subsequently sealed so that the cooling of the liquid creates a reduced volume in the container. The container has a base, a shoulder above the base, a closeable neck on the shoulder permitting filling and discharge of the liquid, and a body connecting the base and the shoulder and defining a label mount section. The label mount section has a plurality of identical, spaced-apart collapse panels with a land located between adjacent collapse panels. Each collapse panel is vertically elongate and has a predetermined width, and each land is vertically elongate and has a predetermined width.

The improvement comprises an upper and a lower series of peripherally spaced ribs separated endwise by label mount areas. Each upper rib is located within the label mount section and is centered above one of the lands. Each lower rib is located within the label mount area and is centered below one of the lands. Each upper and lower rib has a length at least as great as the width of one of the lands, but does not extend completely above

or below the narrow ends of the collapse panels. This arrangement provides label mount areas between endwise adjacent ribs.

#### Brief Description of the Drawings

5        Fig. 1 is an elevational view of a container having reinforcement ribs in accordance with the present invention; and

      Fig. 2 is an elevational view of the container shown in Fig. 1 rotated 30° about a central vertical axis.

#### 10    Description of the Preferred Embodiment

      Figs. 1 and 2 illustrate a blow-molded plastic container 10 useful in containing beverages such as juice. The empty container 10 can be filled by automated, high-speed, hot-fill processing equipment  
15    known in the art.

      Hot-fill processing creates stress and strain on the container structure. For instance, internal pressure is exerted on the container when the beverage is charged into the container at high volumetric flow rates, and  
20    external pressure results from cooling of the capped container filled with high temperature product.

      The container 10 has many features in common with known collapse-panel containers. For instance, the container 10 has a base 12 and a shoulder 14 above the  
25    base 12. The shoulder 14 has a closeable neck 16 for permitting filling and discharge of a beverage. The container 10 has a body 18 of generally circular cross-section connecting the shoulder 14 and the base 12.

      A label (not shown) can be applied to the container  
30    10 for product and source identification as well as informational, promotional and advertising purposes. To this end, the container 10 has an upper label bumper 22 and a lower label bumper 24 defining therebetween a label

mount section 26. When applied, the label extends around the entire periphery of the container 10 and is secured with adhesives to the label mount section 26.

To withstand the forces resulting from hot-fill processing, the body 18 is provided with means to prevent unintended distortion of the container 10. To this end, a plurality of collapse panels 28 are located on the body 18 to provide a controlled response to the pressures causing the container to deform inwardly. As shown in the drawings, the container 10 has six identical collapse panels 28 evenly spaced apart around the periphery of the body 18. Each collapse panel 28 has an upper end 40 terminating in upper corners 42 and a lower end 44 terminating in lower corners 46. A series of vertically-elongate lands 30 are located between adjacent collapse panels 28 and separate them. Each land 30 has a width "L". The collapse panels 28 and lands 30 are located within the label mount section 26, and therefore are hidden from view after a label is applied to the container 10.

Although the collapse panels 28 are intended to respond to various pressures exerted on the container 10, the remaining structure of the container 10 must remain rigid and resist distortion. For this purpose, a series of short, horizontal upper ribs 32 are provided to stiffen the container 10 adjacent the upper corners 42 of the collapse panels 28, and a series of short, horizontal lower ribs 34 are provided to stiffen the container 10 adjacent lower corners 46 of the collapse panels 28. As shown in the drawings, the upper and lower ribs 32 and 34 are inwardly convex and are aligned endwise about the periphery of the container body 18 to form a chain-like configuration. All the upper ribs 32 are positioned at the same container elevation and are separated endwise, i.e. they do not touch or overlap. Similarly, all the

lower ribs 34 are positioned at the same container elevation and do not touch or overlap. The ends 32a and 32b of endwise adjacent ribs 32 terminate above and inwardly of the upper corners 42 of the collapse panel 28a.

As shown, each upper rib 32 and lower rib 34 is centered above or below one of the lands 30 and within the label mount section 26. Since there are six collapse panels 28, there are six lands 30, six upper ribs 32 and six lower ribs 34. Each upper and lower rib 32 and 34 extend a distance at least as great as the width "L" of one of the lands 30. However, in order to ensure desirable spacing between the ends of adjacent ribs, such as ends 32a and 32b, each upper and lower rib 32 and 34 extends only above, or below, the upper corners 42, or lower corners 46, of the collapse panels 28 and not along the entire length of the upper ends 40, or lower ends 44, of the collapse panels 28. Preferably, all ribs 32 and 34 are of the same length and, in aggregate, occupy about half of the periphery of the container body.

The short lengths of the upper and lower ribs 32 and 34 aid in effective label attachment. This is because areas 36 between the ends 32a and 32b of adjacent upper ribs 32 provide smooth, supplemental, spaced areas for the application of adhesives for securing labels. Likewise, areas 38 between the ends of adjacent lower ribs 34 provide smooth areas for the application of adhesives.

In view of the foregoing, it should be apparent that the present invention now provides a hot-fillable blow-molded plastic container which is not only resistant to distortion, but which also enhances label attachment by providing desirably-located label-adhesive areas.

While a preferred embodiment of the present invention has been described in detail, various modifications, alterations, and changes may be made without departing from the spirit and the scope of the present invention as defined in the appended claim.

5



## Claim

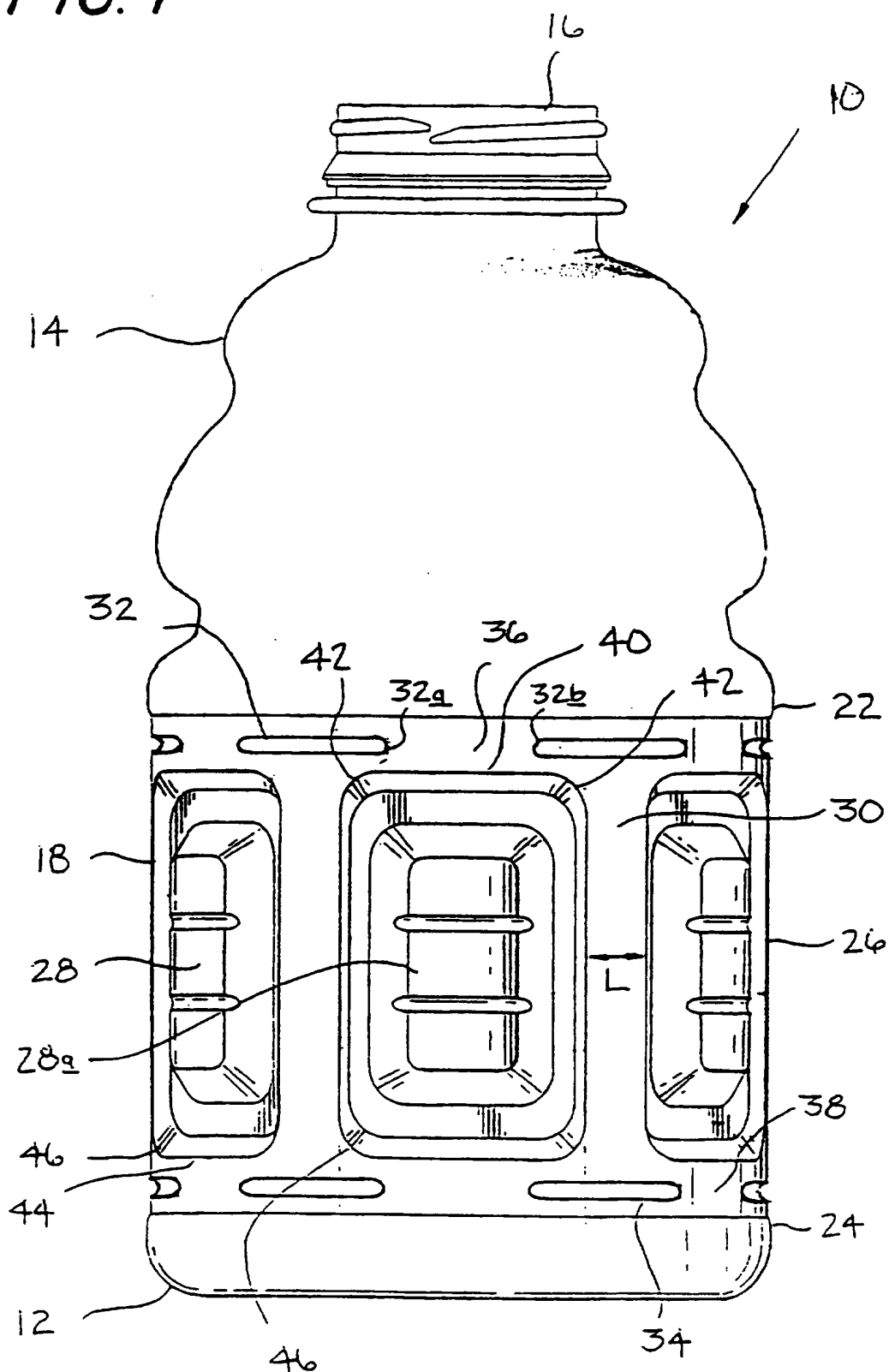
1. In a hot-fillable, blow-molded plastic container (10) for containing a liquid filled initially in a hot state and subsequently sealed so that the cooling of the liquid creates a reduced volume in the container (10), the container (10) having a base (12), a shoulder (14) above the base (12), a closable neck (16) on the shoulder (14) permitting filling and discharge of the liquid, and a body (18) connecting the base (12) and the shoulder (14) and defining a label mount section (26), the label mount section (26) having a plurality of identical, spaced-apart vertically-elongate collapse panels (28) with an upper end (40) terminating at upper corners (42) and a lower end (44) terminating at lower corners (46), adjacent collapse panels (28) being separated by a vertically-elongate land (30) located therebetween, each land (30) having a width "L", the improvement comprising:

an upper and a lower series of short peripherally-spaced ribs (32, 34), each said upper rib (32) being located within the label mount section (26) and centered above one of the lands (30), and each said lower rib (34) being located within the label mount area (26) and centered below one of the lands (30);  
each said upper rib (32) being aligned endwise, extending a length at least as great as the width "L" of one of the lands (30), and terminating a predetermined distance from adjacent upper ribs (32);

each said lower rib (34) being aligned endwise, extending a length at least as great as the width "L" of one of the lands (30), and terminating a predetermined distance from adjacent lower ribs (34); and  
said ribs (32, 34) being located relative to said lands (30) and collapse panel corners (42, 46) to provide desirable reinforcement adjacent said collapse panels (28) and to provide supplemental smooth areas for receiving label attachment adhesive above and below said collapse panels (28).

1/2

FIG. 1





## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US97/04288

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : B65D 1/02, 1/40, 1/46, 23/08, 25/34

US CL : 215/381, 382; 220/666, 669, 675

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 215/381, 382; 220/666, 669, 675

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,337,909 A (VAILLIENCOURT) 16 AUGUST 1994 (16/08/94), see entire document, especially Figure 5.	1
Y	US 5,199,588 A (HAYASHI) 06 APRIL 1993 (06/04/93), see entire document, especially Figure 1.	1
A	US 5,341,946 A (VAILLIENCOURT ET AL) 30 AUGUST 1994 (30/08/94).	
A	US 5,178,289 A (KRISHNAKUMAR ET AL) 12 JANUARY 1993 (12/01/93).	
A	US 5,092,475 A (KRISHNAKUMAR ET AL) 03 MARCH 1992 (03/03/92).	

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search

05 JUNE 1997

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US97/04288

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,064,081 A (HAYASHI ET AL) 12 NOVEMBER 1991 (12/11/91).	
A	US 5,054,632 A (ALBERGHINI ET AL) 08 OCTOBER 1991 (08/10/91).	
A	US 4,863,046 A (COLLETTE ET AL) 05 SEPTEMBER 1989 (05/09/89).	

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(71) Applicant (for all designated States except US): GRAHAM  
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(72) Inventor; and  
(75) Inventor/Applicant (for US only): TOBIAS, John, W.  
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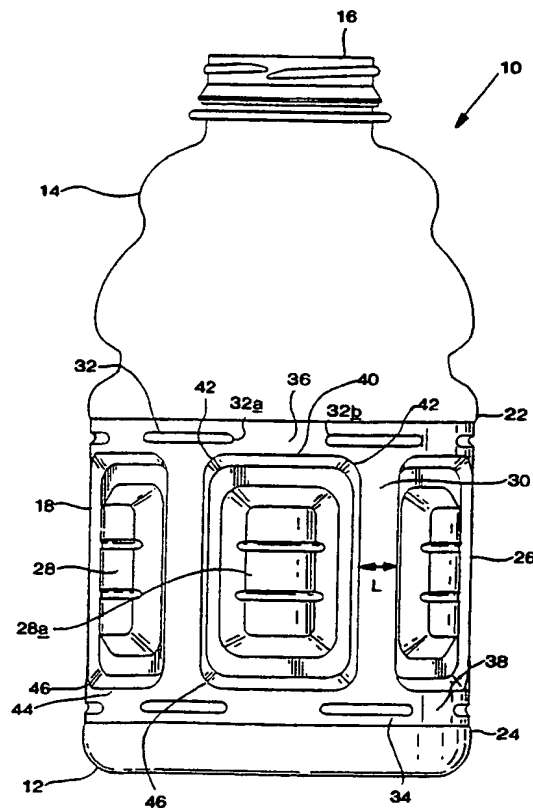
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(57) Abstract

A blow-molded plastic container (10) intended for use in hot-fill processing. The container (10) has a series of short, upper and lower ribs (32, 34) which are spaced apart endwise and which extend peripherally about the container sidewall above and below lands (30) between vertically elongate collapse panels (28) and adjacent corners (42, 46) of collapse panels (28) to reinforce the container (10) at selected locations while providing additional areas for receiving label attachment adhesive.



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BLOW-MOLDED CONTAINER HAVING LABEL MOUNT REGIONS  
SEPARATED BY PERIPHERALLY SPACED RIBS

Field of the Invention

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10      Background of the Invention

      Blow-molded hot-fill containers having vacuum-collapse panels and reinforcing ribs are known. For instance, U.S. Patent 4,863,046 to Collette et al. discloses vertically-disposed ribs in the land area  
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20      of square cross-section having reinforcing ribs located directly above and below vertically-elongate collapse panels. U.S. Patent 5,178,289 to Krishnakumar et al. discloses interrupted ribs in a container structure similar to that disclosed in the aforementioned '046  
25      patent to Collette et al. U.S. Patent 5,337,909 to Vaillencourt discloses a hot-fill container having continuous peripheral ribs in a label mounting region above and below vacuum panels.

      In the '909 Valliencourt patent, the continuous  
30      reinforcing rings, being located in the label mounting area of the container, limit the area available for the application of label adhesives. Although the Hayashi et al. patent incorporates discontinuous reinforcing ribs, they are located directly above and below the vacuum  
35      panels at locations that do not provide significant

reinforcement. A commercially desirably hot-fill blow-molded vacuum-panel container is one which provides desirable reinforcement in conjunction with a maximum area for application of label adhesive.

5    Objects of the Invention

With the foregoing in mind, a primary object of the present invention is to provide a hot-fill blow-molded container having collapse panels that are reinforced in a manner that also maximizes areas available for the application of label adhesive.

Summary of the Invention

More specifically, the present invention provides an improved hot-fillable, blow-molded plastic container for containing a liquid filled initially in a hot state and subsequently sealed so that the cooling of the liquid creates a reduced volume in the container. The container has a base, a shoulder above the base, a closeable neck on the shoulder permitting filling and discharge of the liquid, and a body connecting the base and the shoulder and defining a label mount section. The label mount section has a plurality of identical, spaced-apart collapse panels with a land located between adjacent collapse panels. Each collapse panel is vertically elongate and has a predetermined width, and each land is vertically elongate and has a predetermined width.

The improvement comprises an upper and a lower series of peripherally spaced ribs separated endwise by label mount areas. Each upper rib is located within the label mount section and is centered above one of the lands. Each lower rib is located within the label mount area and is centered below one of the lands. Each upper and lower rib has a length at least as great as the width of one of the lands, but does not extend completely above

or below the narrow ends of the collapse panels. This arrangement provides label mount areas between endwise adjacent ribs.

#### Brief Description of the Drawings

5        Fig. 1 is an elevational view of a container having reinforcement ribs in accordance with the present invention; and

      Fig. 2 is an elevational view of the container shown in Fig. 1 rotated 30° about a central vertical axis.

#### 10    Description of the Preferred Embodiment

      Figs. 1 and 2 illustrate a blow-molded plastic container 10 useful in containing beverages such as juice. The empty container 10 can be filled by automated, high-speed, hot-fill processing equipment  
15    known in the art.

      Hot-fill processing creates stress and strain on the container structure. For instance, internal pressure is exerted on the container when the beverage is charged into the container at high volumetric flow rates, and  
20    external pressure results from cooling of the capped container filled with high temperature product.

      The container 10 has many features in common with known collapse-panel containers. For instance, the container 10 has a base 12 and a shoulder 14 above the  
25    base 12. The shoulder 14 has a closeable neck 16 for permitting filling and discharge of a beverage. The container 10 has a body 18 of generally circular cross-section connecting the shoulder 14 and the base 12.

      A label (not shown) can be applied to the container  
30    10 for product and source identification as well as informational, promotional and advertising purposes. To this end, the container 10 has an upper label bumper 22 and a lower label bumper 24 defining therebetween a label

mount section 26. When applied, the label extends around the entire periphery of the container 10 and is secured with adhesives to the label mount section 26.

To withstand the forces resulting from hot-fill processing, the body 18 is provided with means to prevent unintended distortion of the container 10. To this end, a plurality of collapse panels 28 are located on the body 18 to provide a controlled response to the pressures causing the container to deform inwardly. As shown in the drawings, the container 10 has six identical collapse panels 28 evenly spaced apart around the periphery of the body 18. Each collapse panel 28 has an upper end 40 terminating in upper corners 42 and a lower end 44 terminating in lower corners 46. A series of vertically-elongate lands 30 are located between adjacent collapse panels 28 and separate them. Each land 30 has a width "L". The collapse panels 28 and lands 30 are located within the label mount section 26, and therefore are hidden from view after a label is applied to the container 10.

Although the collapse panels 28 are intended to respond to various pressures exerted on the container 10, the remaining structure of the container 10 must remain rigid and resist distortion. For this purpose, a series of short, horizontal upper ribs 32 are provided to stiffen the container 10 adjacent the upper corners 42 of the collapse panels 28, and a series of short, horizontal lower ribs 34 are provided to stiffen the container 10 adjacent lower corners 46 of the collapse panels 28. As shown in the drawings, the upper and lower ribs 32 and 34 are inwardly convex and are aligned endwise about the periphery of the container body 18 to form a chain-like configuration. All the upper ribs 32 are positioned at the same container elevation and are separated endwise, i.e. they do not touch or overlap. Similarly, all the

lower ribs 34 are positioned at the same container elevation and do not touch or overlap. The ends 32a and 32b of endwise adjacent ribs 32 terminate above and inwardly of the upper corners 42 of the collapse panel 28a.

As shown, each upper rib 32 and lower rib 34 is centered above or below one of the lands 30 and within the label mount section 26. Since there are six collapse panels 28, there are six lands 30, six upper ribs 32 and six lower ribs 34. Each upper and lower rib 32 and 34 extend a distance at least as great as the width "L" of one of the lands 30. However, in order to ensure desirable spacing between the ends of adjacent ribs, such as ends 32a and 32b, each upper and lower rib 32 and 34 extends only above, or below, the upper corners 42, or lower corners 46, of the collapse panels 28 and not along the entire length of the upper ends 40, or lower ends 44, of the collapse panels 28. Preferably, all ribs 32 and 34 are of the same length and, in aggregate, occupy about half of the periphery of the container body.

The short lengths of the upper and lower ribs 32 and 34 aid in effective label attachment. This is because areas 36 between the ends 32a and 32b of adjacent upper ribs 32 provide smooth, supplemental, spaced areas for the application of adhesives for securing labels. Likewise, areas 38 between the ends of adjacent lower ribs 34 provide smooth areas for the application of adhesives.

In view of the foregoing, it should be apparent that the present invention now provides a hot-fillable blow-molded plastic container which is not only resistant to distortion, but which also enhances label attachment by providing desirably-located label-adhesive areas.

While a preferred embodiment of the present invention has been described in detail, various modifications, alterations, and changes may be made without departing from the spirit and the scope of the present invention as defined in the appended claim.

5

## Claim

1. In a hot-fillable, blow-molded plastic container (10) for containing a liquid filled initially in a hot state and subsequently sealed so that the cooling of the liquid creates a reduced volume in the container (10), the container (10) having a base (12), a shoulder (14) above the base (12), a closable neck (16) on the shoulder (14) permitting filling and discharge of the liquid, and a body (18) connecting the base (12) and the shoulder (14) and defining a label mount section (26), the label mount section (26) having a plurality of identical, spaced-apart vertically-elongate collapse panels (28) with an upper end (40) terminating at upper corners (42) and a lower end (44) terminating at lower corners (46), adjacent collapse panels (28) being separated by a vertically-elongate land (30) located therebetween, each land (30) having a width "L", the improvement comprising:

an upper and a lower series of short peripherally-spaced ribs (32, 34), each said upper rib (32) being located within the label mount section (26) and centered above one of the lands (30), and each said lower rib (34) being located within the label mount area (26) and centered below one of the lands (30);  
each said upper rib (32) being aligned endwise, extending a length at least as great as the width "L" of one of the lands (30), and terminating a predetermined distance from adjacent upper ribs (32);

each said lower rib (34) being aligned endwise, extending a length at least as great as the width "L" of one of the lands (30), and terminating a predetermined distance from adjacent lower ribs (34); and

said ribs (32, 34) being located relative to said lands (30) and collapse panel corners (42, 46) to provide desirable reinforcement adjacent said collapse panels (28) and to provide supplemental smooth areas for receiving label attachment adhesive above and below said collapse panels (28).



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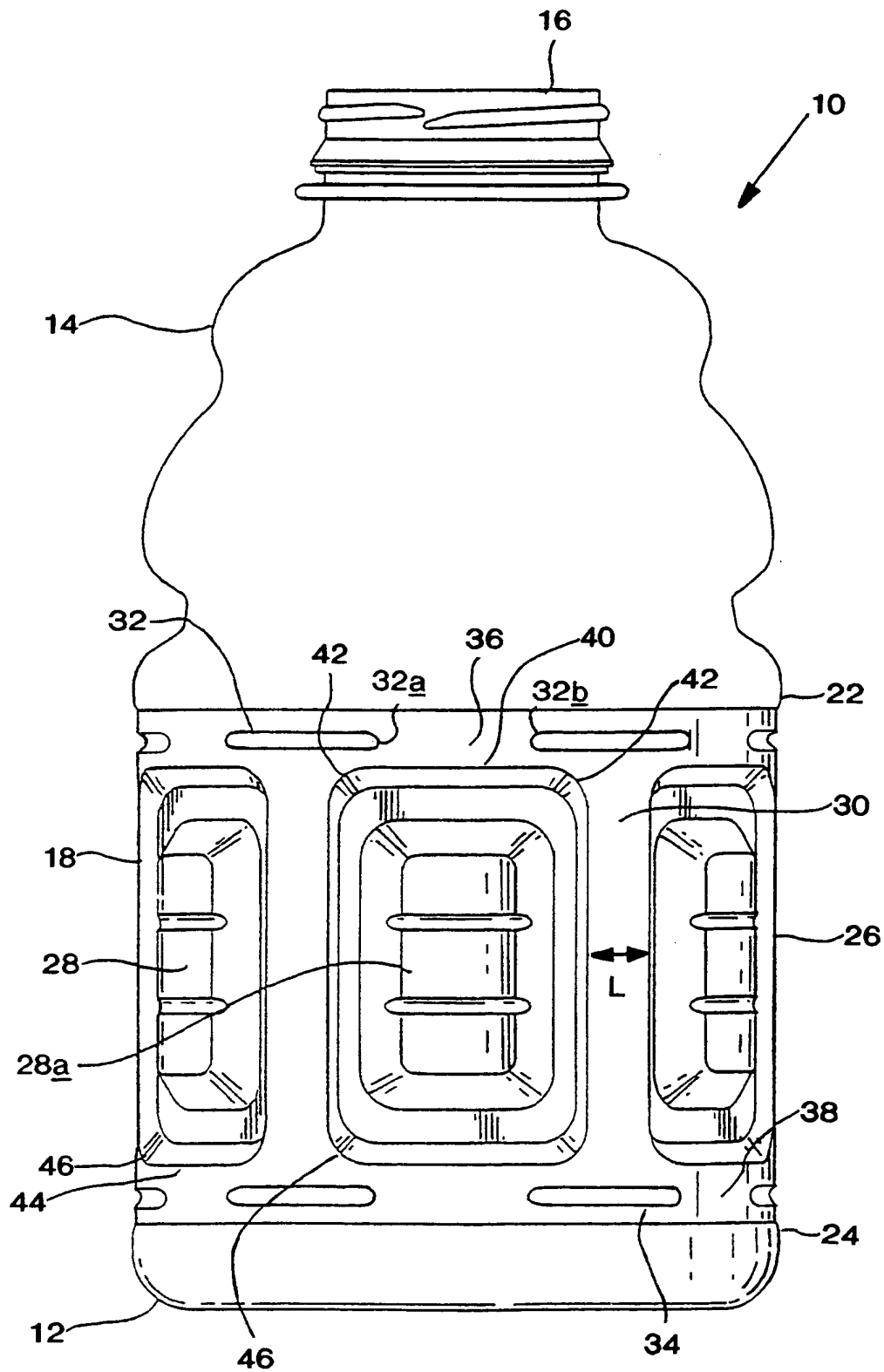


FIG. 1

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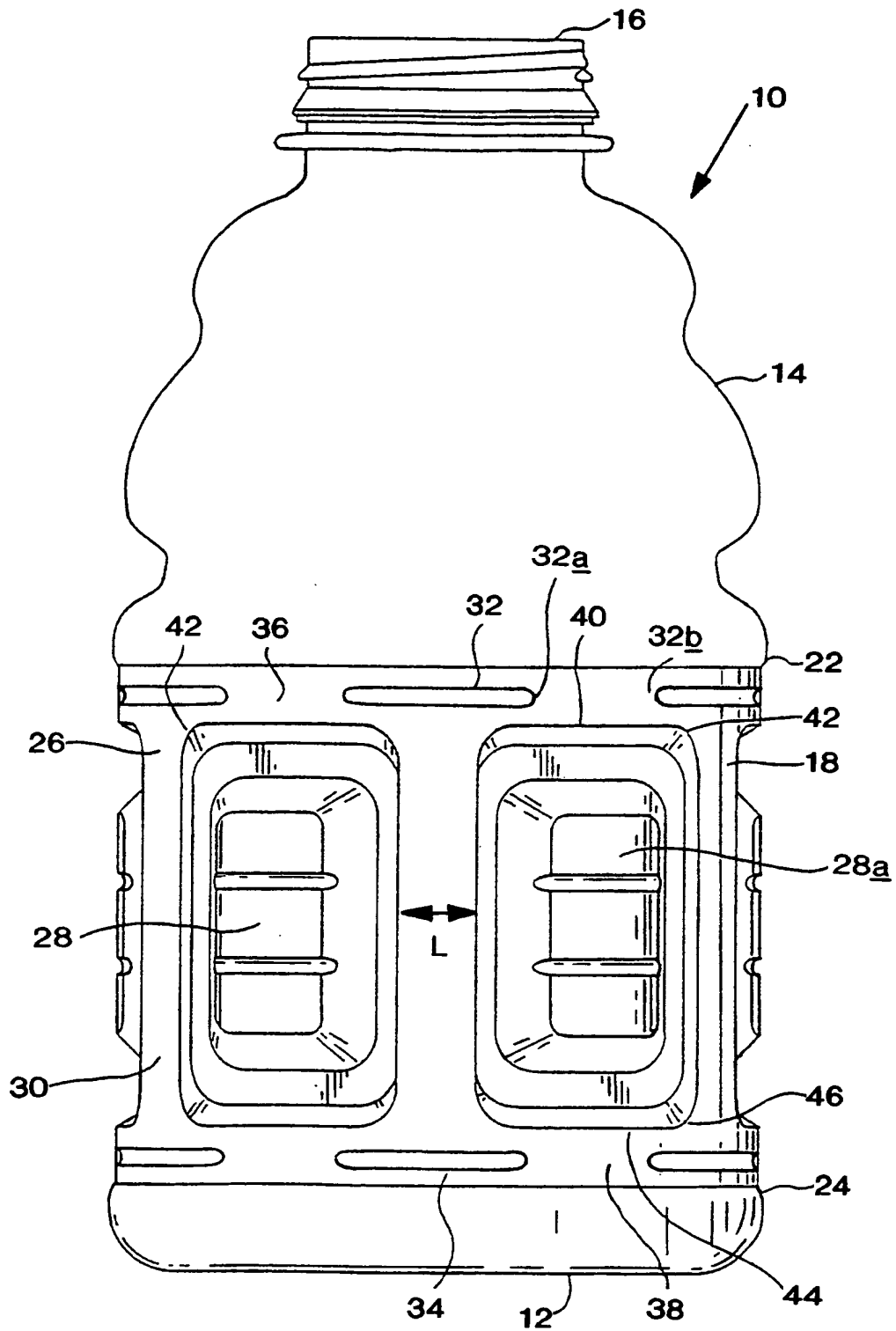


FIG. 2

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US97/04288**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) : B65D 1/02, 1/40, 1/46, 23/08, 25/34

US CL : 215/381, 382; 220/666, 669, 675

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 215/381, 382; 220/666, 669, 675

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,337,909 A (VAILLIENCOURT) 16 AUGUST 1994 (16/08/94), see entire document, especially Figure 5.	1
Y	US 5,199,588 A (HAYASHI) 06 APRIL 1993 (06/04/93), see entire document, especially Figure 1.	1
A	US 5,341,946 A (VAILLIENCOURT ET AL) 30 AUGUST 1994 (30/08/94).	
A	US 5,178,289 A (KRISHNAKUMAR ET AL) 12 JANUARY 1993 (12/01/93).	
A	US 5,092,475 A (KRISHNAKUMAR ET AL) 03 MARCH 1992 (03/03/92).	

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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*O* document referring to an oral disclosure, use, exhibition or other means	
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Date of the actual completion of the international search

05 JUNE 1997

Date of mailing of the international search report

26 JUN 1997

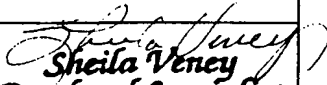
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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US97/04288

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,064,081 A (HAYASHI ET AL) 12 NOVEMBER 1991 (12/11/91).	
A	US 5,054,632 A (ALBERGHINI ET AL) 08 OCTOBER 1991 (08/10/91).	
A	US 4,863,046 A (COLLETTE ET AL) 05 SEPTEMBER 1989 (05/09/89).	

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